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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,708	08/25/2003	Alfred Ecker	038741.52686US	9822

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EXAMINER	
YAM, STEPHEN K	
ART UNIT	**PAPER NUMBER**
2878	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/646,708	ECKER ET AL.	
	Examiner	Art Unit	
	Stephen Yam	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-12,15,17 and 19-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-12,15,17 and 19-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 5, 2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 7, & 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Lyons US Patent No. 6,650,799.

Regarding Claim 1, Lyons discloses a fluid flow sensor used for applications of measuring fluid velocity and pressure in airplanes and boats (see column 1, lines 20-22, 52-54, 60-62) comprising: an optical fiber (16) with grating (26) designed as a Bragg grating sensor (see column 3, lines 48-51); and body (38) with a V-shaped groove (33) to represent a workpiece. As illustrated in Figure 1, the fiber (16) with the grating sensor (26) is disposed and integrated into a region of a surface of the workpiece (38). Groove (33) is introduced into the surface of the

workpiece (38). Groove (33) is specifically designed to have a breadth and depth matched to the diameter of optical fiber (see Figure 1) in the same manner as stated by Applicant in the Remarks response (see lines 5-11 of Page 8 of Response filed August 22, 2007). Lyons Figure 1 shows sufficient contact of fiber (16) with workpiece (38) so that an appropriate measurement can be obtained. And finally, Lyons illustrates in Figure 1 that optical fiber (16) is arranged in the groove (33) as a recess. Lyons further discloses the Bragg grating sensor performing a metrological instrumentation of the workpiece (see Col. 1, lines 45-49, 63-67).

With respect to claim 7, Lyons illustrates in Figure 1 that optical fiber (16) is arranged without curvature in a form of a straight line in the region on the surface of the workpiece (38).

With respect to claim 10, Lyons discloses body (38) to be any body over which fluid (12) flows. Lyons specifically gives examples such as a ship, airfoil, and a submarine (see column 3, lines 60-64). These examples would be situations where workpiece (38) would be designed as a dynamically loaded component.

With respect to claim 11, Lyons discloses the sensor to measure properties of the body (38) as a dynamically loaded component (see column 3, lines 64-67).

With respect to claim 12, Lyons discloses a fluid flow sensor used for applications of measuring fluid velocity and pressure in airplanes and boats (see column 1, lines 20-22, 52-54, 60-62) and a corresponding method comprising: an optical fiber (16) with grating (26) designed as a Bragg grating sensor (see column 3, lines 48-51); and body (38) with a V-shaped groove (33) to represent a workpiece. As illustrated in Figure 1, the fiber (16) with the grating sensor (26) is disposed and integrated into a region of a surface of the workpiece (38). Groove (33) is introduced into the surface of the workpiece (38). Groove (33) is specifically designed to have a

breadth and depth matched to the diameter of optical fiber (see Figure 1) in the same manner as stated by Applicant in the Remarks response (see lines 5-11 of Page 8 of Response filed August 22, 2007). Lyons Figure 1 shows sufficient contact of fiber (16) with workpiece (38) so that an appropriate measurement can be obtained. And finally, Lyons illustrates in Figure 1 that optical fiber (16) is arranged in the groove (33) as a recess. Lyons further discloses the Bragg grating sensor performing a metrological instrumentation of the workpiece (see Col. 1, lines 45-49, 63-67).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5-6, 15, 17, & 19-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyons.

With respect to claims 5-6, Lyons discloses the device as previously described. However, Lyons does not explicitly disclose the use of a second optical fiber in a different geometrical configuration and curvature. To modify the teachings of Lyons accordingly is known in the art as a mere duplication of parts and would have been obvious to one of ordinary skill in the art because this arrangement would allow for determination of the strains over a greater area of the workpiece.

With respect to claims 15 & 19, the modified Lyons discloses the device as previously described. However, the modified Lyons does not explicitly disclose the use of a second optical fiber in a different geometrical configuration and curvature. To modify the teachings of Lyons accordingly is known in the art as a mere duplication of parts and would have been obvious to one of ordinary skill in the art because this arrangement would allow for determination of the strains over a greater area of the workpiece.

With respect to claim 17, the modified Lyons discloses the use of the device in an airfoil application, but does not specifically disclose the device in a turbine blade or housing. However, it is known in the art that turbine blades and airfoils face similar fluid dynamics concerns and are both governed by Bernoulli conditions. To modify the teachings of Lyons for use in a turbine blade is known the art as an intended use of the device and would have been obvious to one of ordinary skill in the art because the sensor of Lyons would have provided a non-intrusive device easily installed on the turbine blade for accurate determination of the fluid properties faced by the turbine blade.

With respect to claim 20, the modified Lyons discloses the use of the device in an airfoil application, but does not specifically disclose the device in a turbine blade or housing. However, it is known in the art that turbine blades and airfoils face similar fluid dynamics concerns and are both governed by Bernoulli conditions. To modify the teachings of Lyons for use in a turbine blade is known the art as an intended use of the device and would have been obvious to one of ordinary skill in the art because the sensor of Lyons would have provided a non-intrusive device easily installed on the turbine blade for accurate determination of the fluid properties faced by the turbine blade.

With respect to claim 21, the modified Lyons discloses the use of the device in an airfoil application, but does not specifically disclose the device in a turbine blade or housing. However, it is known in the art that turbine blades and airfoils face similar fluid dynamics concerns and are both governed by Bernoulli conditions. To modify the teachings of Lyons for use in a turbine blade is known the art as an intended use of the device and would have been obvious to one of ordinary skill in the art because the sensor of Lyons would have provided a non-intrusive device easily installed on the turbine blade for accurate determination of the fluid properties faced by the turbine blade.

With respect to claim 22, the modified Lyons discloses the device as previously described. Lyons also discloses amplifier (138) as part of an electronic evaluation system to determine fluid velocity, but does not explicitly disclose the determination of a measured vibration or temperature. To modify the teachings of Lyons to determine vibration or temperature is known in the art and would have been obvious to one of ordinary skill in the art because this would allow the device additional versatility.

With respect to claim 23, the modified Lyons discloses the device as previously described. However, the modified Lyons does not explicitly disclose the use of a polyimide-coated glass fiber. The use of polyimide-coated glass fibers is known in the art and would have been obvious to one of ordinary skill in the art because they provide for a relatively low cost fiber with the structural integrity required to last the conditions faced by the workpiece.
With respect to claim 24, the modified Lyons discloses the device as previously described. Lyons also discloses amplifier (138) as part of an electronic evaluation system to determine fluid velocity, but does not explicitly disclose the determination of a measured vibration or

temperature. To modify the teachings of Lyons to determine vibration or temperature is known in the art and would have been obvious to one of ordinary skill in the art because this would allow the device additional versatility.

With respect to claim 25, the modified Lyons discloses the use of the device in an airfoil application, but does not specifically disclose the device in a turbine blade or housing. However, it is known in the art that turbine blades and airfoils face similar fluid dynamics concerns and are both governed by Bernoulli conditions. To modify the teachings of Lyons for use in a turbine blade is known the art as an intended use of the device and would have been obvious to one of ordinary skill in the art because the sensor of Lyons would have provided a non-intrusive device easily installed on the turbine blade for accurate determination of the fluid properties faced by the turbine blade.

With respect to claim 26, the modified Lyons discloses the device as previously described. Lyons also discloses amplifier (138) as part of an electronic evaluation system to determine fluid velocity, but does not explicitly disclose the determination of a measured vibration or temperature. To modify the teachings of Lyons to determine vibration or temperature is known in the art and would have been obvious to one of ordinary skill in the art because this would allow the device additional versatility.

With respect to claim 27, the modified Lyons discloses the device as previously described. However, the modified Lyons does not explicitly disclose the use of a polyimide-coated glass fiber. The use of polyimide-coated glass fibers is known in the art and would have been obvious to one of ordinary skill in the art because they provide for a relatively low cost fiber with the structural integrity required to last the conditions faced by the workpiece.

With respect to claim 28, the modified Lyons discloses the device as previously described. Lyons also discloses amplifier (138) as part of an electronic evaluation system to determine fluid velocity, but does not explicitly disclose the determination of a measured vibration or temperature. To modify the teachings of Lyons to determine vibration or temperature is known in the art and would have been obvious to one of ordinary skill in the art because this would allow the device additional versatility.

6. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyons in view of Schulz et al. US Patent No. 6,600,149.

Regarding Claims 8 and 9, Lyons teaches the device in Claim 1, according to the appropriate paragraph above. Lyons does not explicitly disclose the arrangement of the Bragg grating sensor arranged in an angular straight line in such a way that the first section of the fiber is angled off from a second section. However, this arrangement is known in the art as Schulz et al disclose in a related optical grating device for determining strain on the workpiece where fiber sensors are embedded on a wing (see figure 17). To modify the teachings of Lyons accordingly would have been obvious to one of ordinary skill in the art because this would allow the fibers to cover as much of the wing as possible and make it possible to dispose the light emitter/detector module as close to each other as possible.

Response to Arguments

7. Applicant's arguments filed December 5, 2007 have been fully considered but they are not persuasive.

Applicant argues that Lyons does not disclose the Bragg grating sensor performing a metrological instrumentation of the workpiece. Examiner asserts that Lyons discloses the properties of the surface of the workpiece (see Col. 1, lines 18-22, 46-49 and Col. 5, lines 6-9). Thus, the Bragg grating sensor in Lyons performs a metrological instrumentation of the workpiece as recited in Applicant's claim.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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